マヨネーズの材料配合比による流動特性の変化

Effect of Ingredients Ratio on Rheological Properties of Mayonnaise

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Ten model systems of mayonnaise were prepared by varying ratios of oil (68-86%), vinegar (5.5-23.5%), and egg yolk (8.5-26.5%), according to Scheffé's simplex lattice design for the three component system, and also dispersed media without adding oil. A E-type viscometer was used for the measurement of their apparent viscosities (η_{app}), yield stresses, and indexes of consistency and flow behavior. The quadratic equations were obtained using the respective parameters for each of the model systems for prediction of the relation between ingredient ratios and the parameters.

The range of η_{app} and that of yield stresses obtained from the graphs prepared to show the characteristics of the model systems were 25.4-1, 430 poise (0.508-4.32 for the dispersed media) and 20.3-1,540 dyn/cm^2, respectively. These results provided a simple means for selection of ingredient ratios in preparing mayonnaise of desired consistency ; the systems with 20-200 dyn/cm^2 were suited for sprinkling (over vegetables), those with 100-200 for both mixing (with vegetables) and sprinkling, those with 100-400 for mixing, those with 400-1,540 for topping, and the one with 400 for both topping and mixing. The range of K values (viscosity) was 13.0-301 dyn$\cdot$sec^n/cm^2. Sibree's volume factor was calculated from η_{app} at 1sec^{-1} and the values decreased from 1.49 to 1.20 by increasing oil concentration, showing dependence of the values on oil concentration. The ranges of pH for the dispersed media and the model systems were 3.4-4.6 and 3.5-4.6, respectively, indicating the pH of model systems depended on the concentration of vinegar in the former.